NEAQS 2004

Meteorological summary for Gulf of Maine and northern coastal New England

Wayne M. Angevine

30 July

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General

A weak area of high pressure progressed to the east into eastern parts of the forecast area through the evening into part of the day. The weak pressure gradient coupled with warm land temperatures helped to create a weak sea breeze near the coastlines of New England. No precipitation was observed near the coast. Winds were light and variable overnight. During the day, winds were generally from the SW at 5-10 kts. Some sea-breezes developed along the coastline. Daytime highs ranged from the low to mid 80's (26-29C) for much of New England. Patchy fog developed over much of Cape Cod and the Gulf of Maine, but fog burned off by mid to late morning for most locations. Fog continued to linger, however, for much of the northeastern Gulf. Some hazy conditions were also noted during the daytime. Much of New England was under clear skies through the night. Some fairly dense high cirrus clouds approached from the west through the day as a low pressure center continued to move in from the Great Lakes. By 0Z July 31st, altostratus clouds began to become increasingly more numerous from east to west.

The ship observed ~105 ppb of ozone at ~2030 UTC, one of the highest readings of the cruise, in the middle of the Gulf of Maine. CO peaked at ~370 ppb between 0500 and 0700 UTC while the ship was north of Cape Ann. Both these peaks appear to have occurred in plumes directly from Boston.

Soundings from the ship at 0500, 1100, 1700, and 2000 UTC showed a strongly statically stable marine boundary layer ~100 m deep, with a near-neutral intermediate layer above extending up to 1.3-2.3 km. Winds aloft were more westerly than near the surface.

Sounding winds	0500 UTC	1100 UTC	1700 UTC	2000 UTC
100 m speed, m/s	8.5	4.5	8.5	11.2
100 m direction	230	290	190	215
500 m speed	5.0	7.0	7.2	10.4
500 m direction	260	280	230	225
1000 m speed	4.5	5.0	7.9	8.5
1000 m direction	260	275	250	240
2000 m speed	9.1	8.1	7.0	6.4
2000 m direction	235	255	270	290

Regional ozone

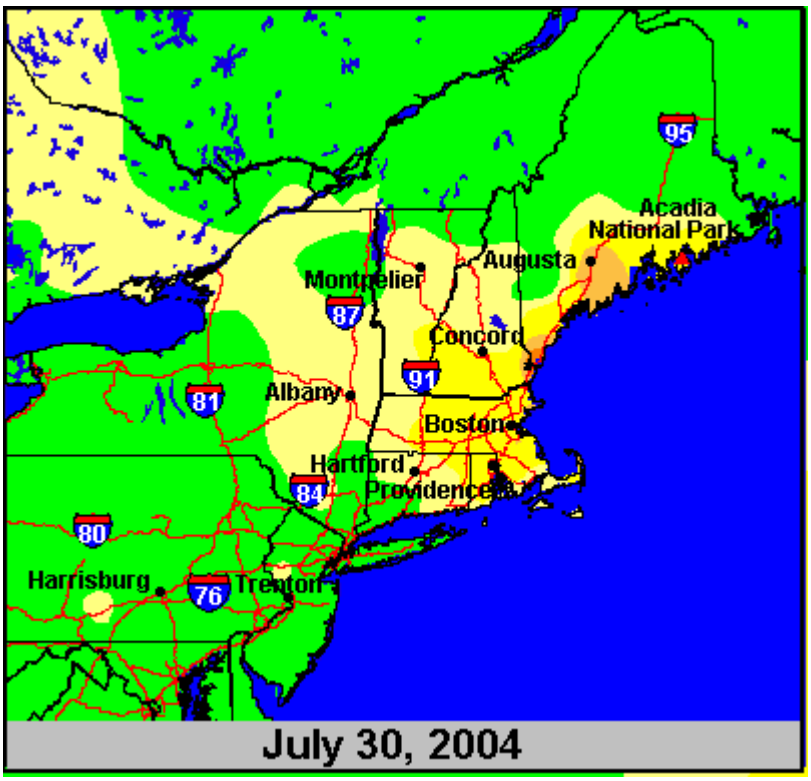

Figure 1: Maximum 1-h ozone pattern from EPA AIRNOW

Footprints

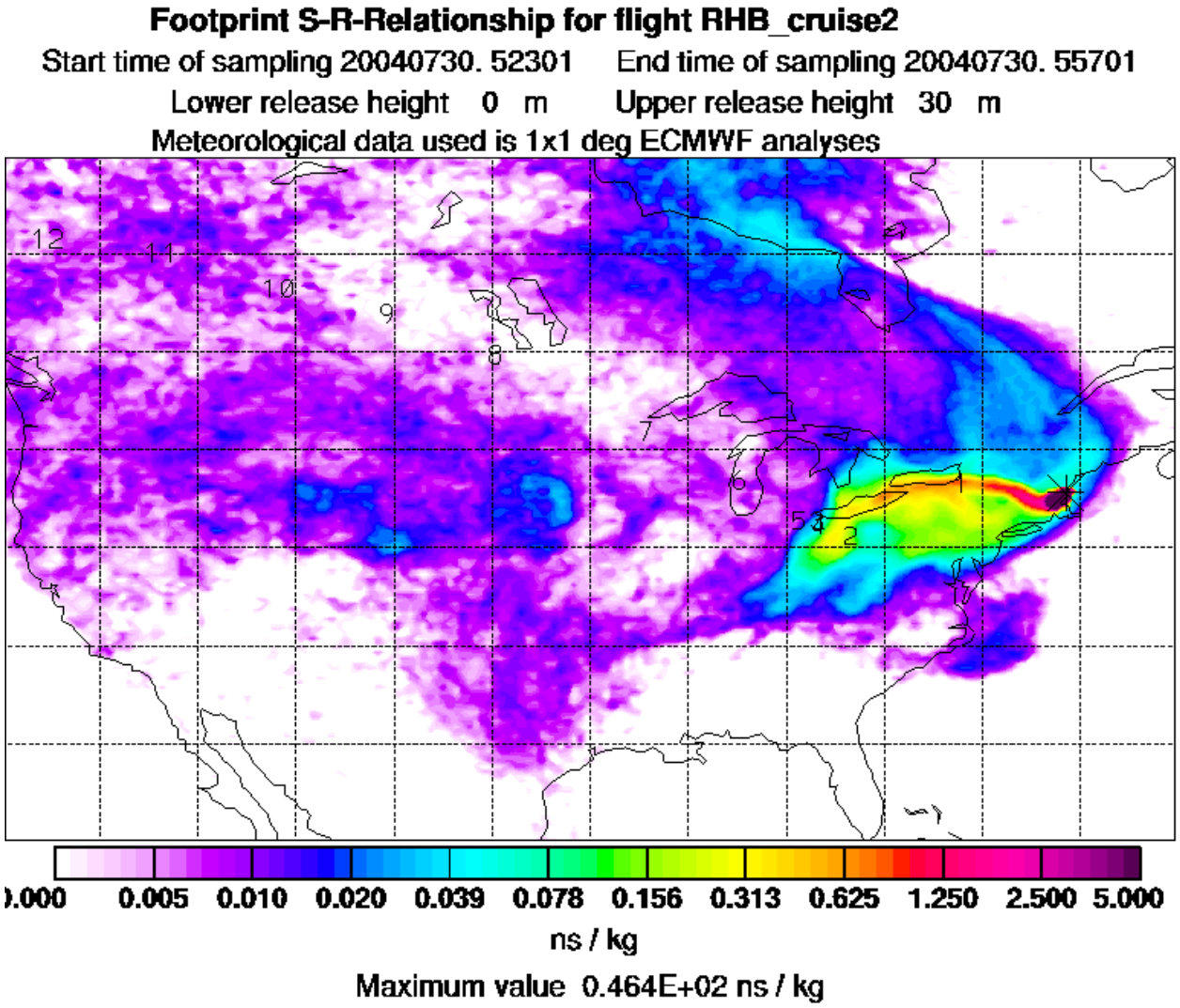

Figure 2: FLEXPART footprint for 0523-0557 UTC 30 July

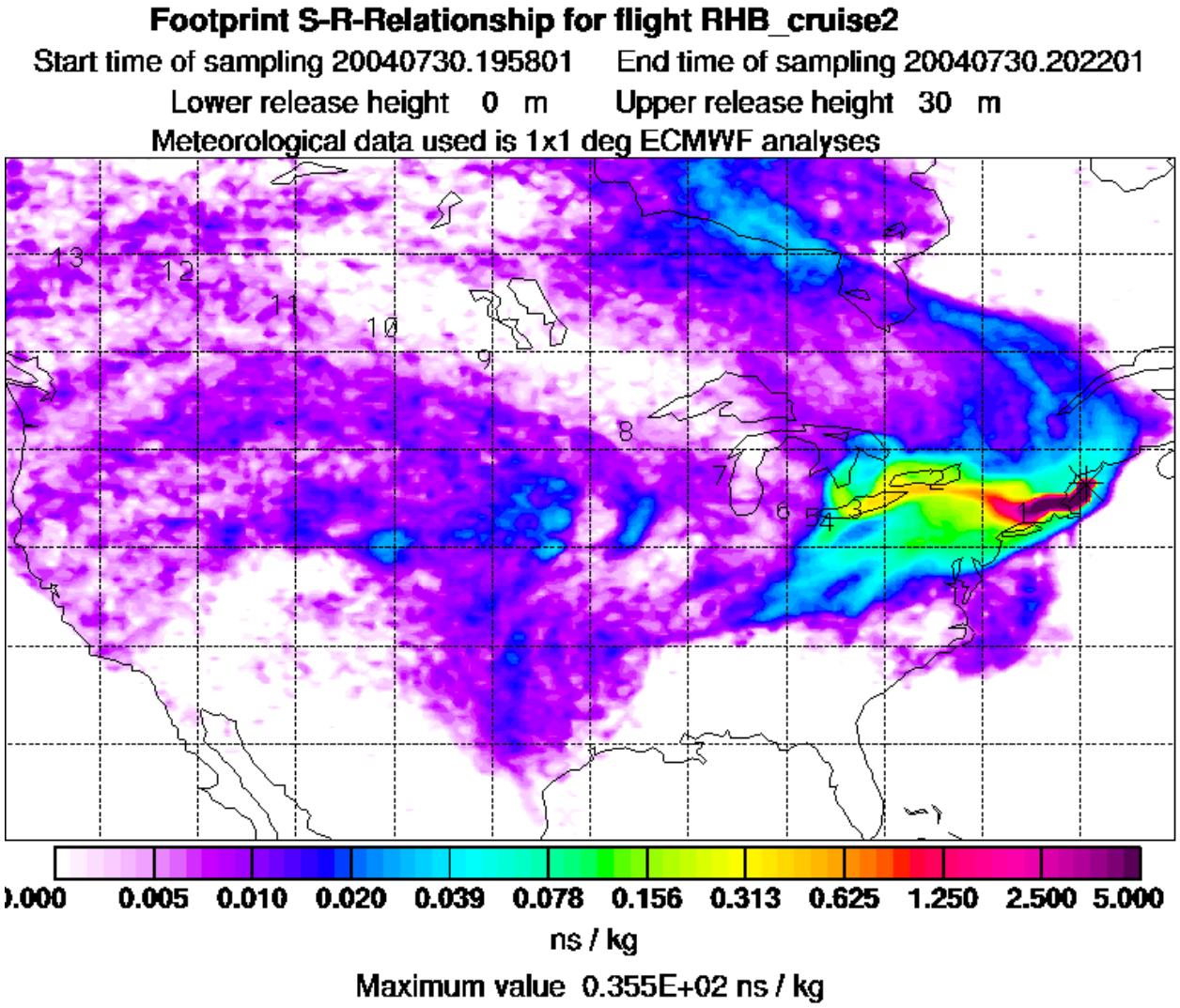

Figure 3: FLEXPART footprint for 1958-2022 UTC 30 July

Ship track plots

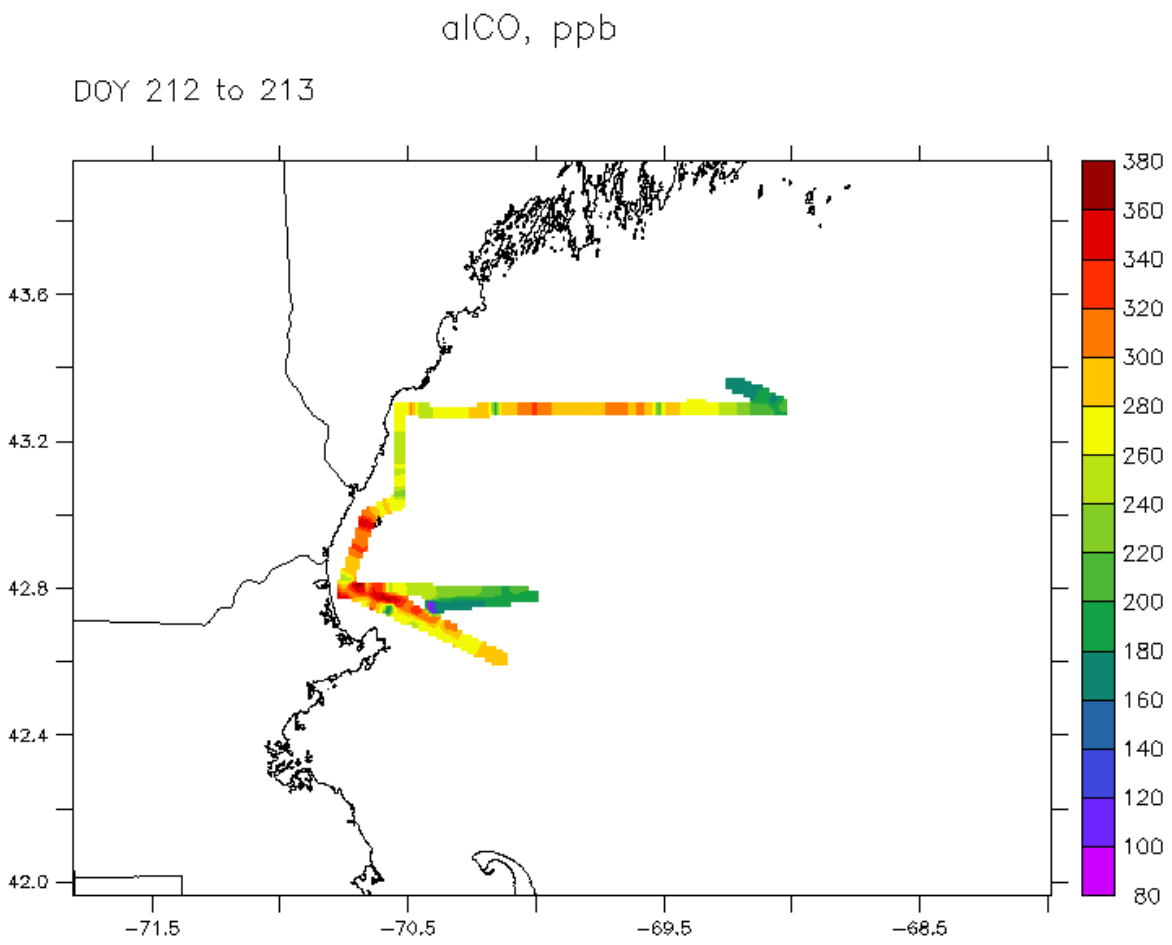

Figure 4: CO along the ship track

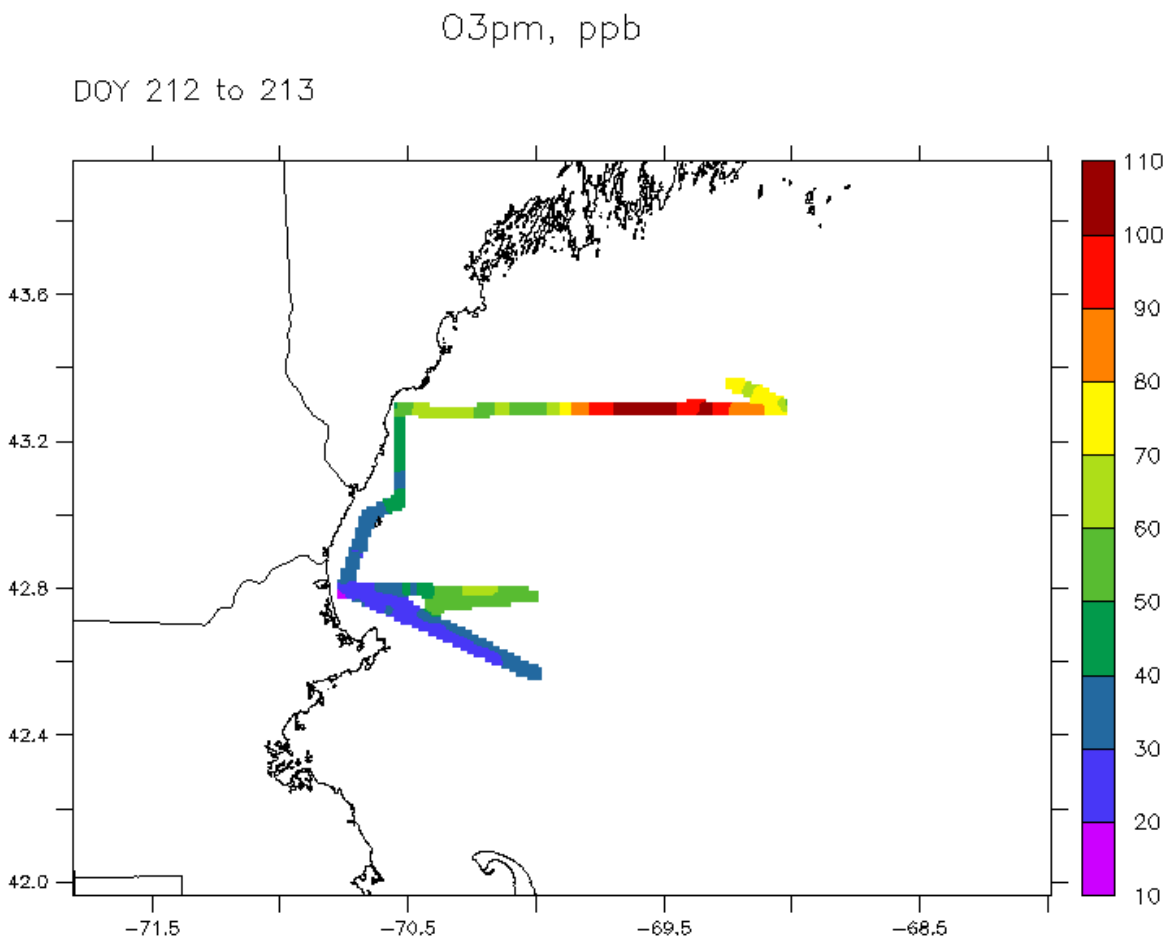

Figure 5: Ozone along the ship track

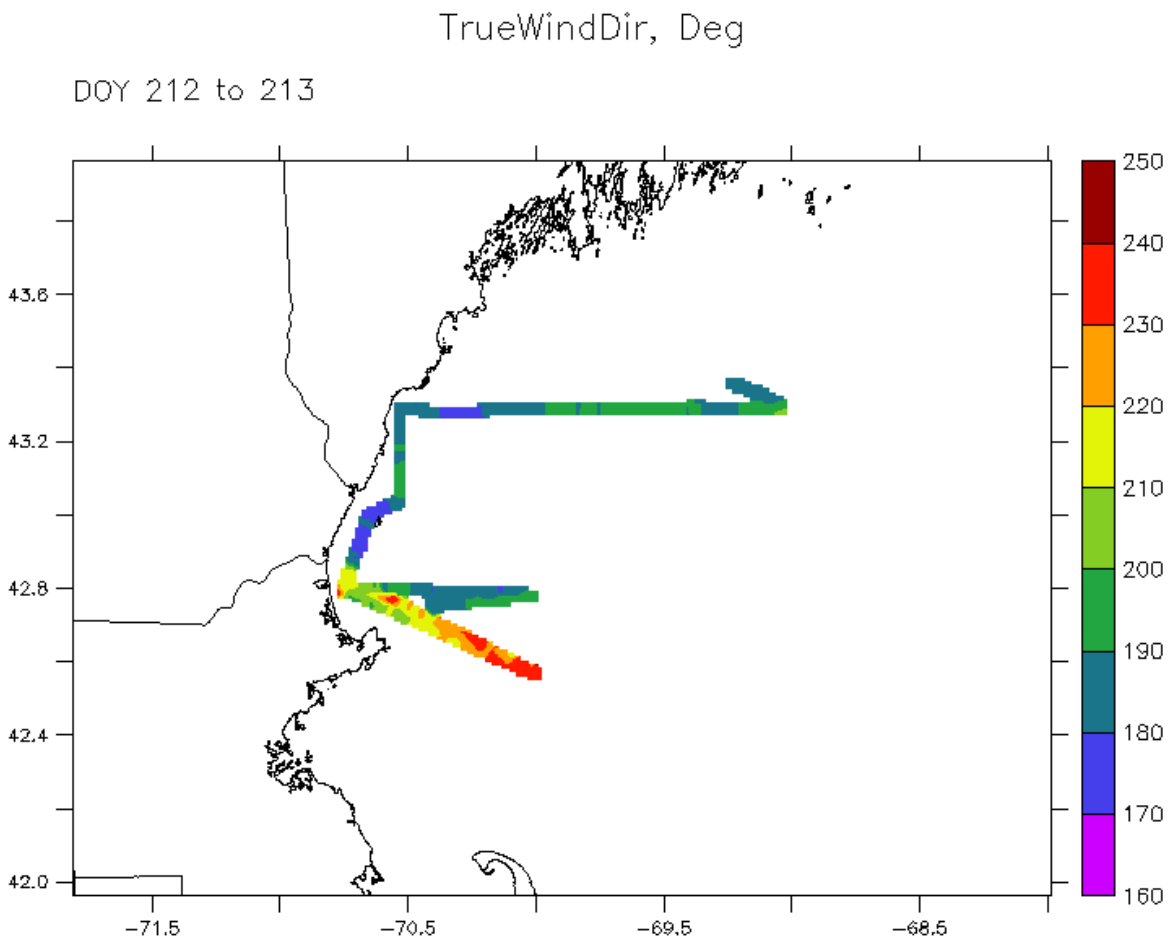

Figure 6: Wind direction along the ship track